COAL PUMP DEVELOPMENT

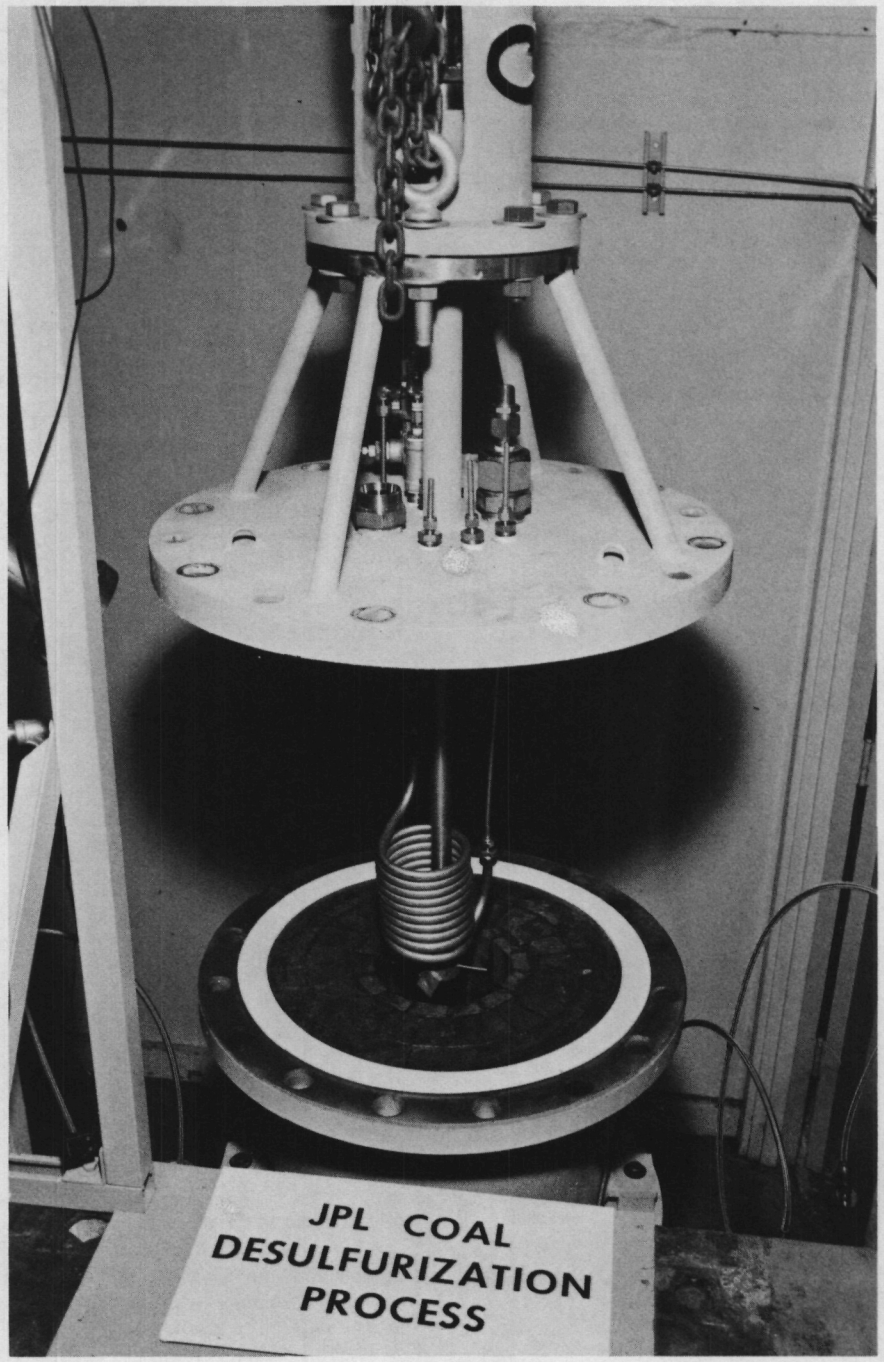
The JPL Coal Pump Development Project for the Department of Energy (DOE) successfully demonstrated plasticating coal pumps ranging in capacity from 25 to 450 pounds per hour. JPL engineers used 11 types of coal, mostly from the eastern United States bituminous fields, in the tests.

The coal was heated to about 400 degrees Celsius in a plasticating screw extruder where it became soft, was pumped to pressure, and was injected directly into a coal conversion reactor. The application of such a coal pump to a hydrogasification process could reduce product cost by about 7 percent in DOE's projected synthetic fuels program.

The rheological properties and solid friction coefficients of various types of coal and their extrudants were categorized in pump runs of up to 34 hours. Theoretical models of the plasticating pump have been developed, aimed at building commercial scale pumps capable of handling 30 to 40 tons of coal per hour.

Techniques for creating a continuous stream of sprayed coal also were developed. In some preliminary batch extrusion tests, coal sprays as fine as 99 percent less than 22 micrometers have been obtained.

Figure (opposite page): A 1.5-inch coal pump (a modified Davis-Standard screw extruder) is shown in a configuration for continuous plastication and generation of a fine spray from coal.


JPL COAL
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